

## Remarks

Claims 30, 33-36, 40, 42, and 44 have been amended for clerical reasons. No new matter has been added through these amendments, nor have these amendments been made for the purposes of patentability. Claims 29-37, 40-46, and 48 are pending in the application.

Claims 29, 33-37, and 40-43 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 5-10 of U.S. Patent No. 5,990,559. Applicant submits a terminal disclaimer herewith thereby rendering this rejection moot.

The pending claims also stand rejected as either anticipated or obvious in view of one single reference, specifically U.S. Patent No. 6,232,629 to Nakamura. Applicant requests that the Examiner reconsider this rejection in view of the remarks that follow for at least the reason that the cited reference does not teach or suggest all of the elements of the pending claims with sufficient detail to anticipate and/or render the claims obvious.

The pending claims are anticipated "only if each and every element as set forth in the claims are found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claim 29 recites an integrated circuit that includes a semiconductive substrate and a roughened platinum layer over the substrate with the roughened platinum layer

comprising columnar platinum pedestals terminating in dome-shaped tops. Claim 29 is allowable for at least the reason that the cited reference does not teach or suggest these features.

Nakamura does not teach or suggest all the features of claim 29. In the Office Action the Examiner has directed the applicant to items 102 and 112 of Nakamura for the teaching of a roughened platinum layer comprising columnar pedestals terminating in dome-shaped tops. Applicant has reviewed those items as they exist in Figs. 3B and 31 in the context of Nakamura's disclosure and cannot identify a description of a roughened platinum layer over the substrate, nor can a roughened platinum layer comprising columnar pedestals terminating in dome-shaped tops be identified.

For example, referring to Fig. 3B, which references item 112 in the context of the specification (col. 1, lines 45-55 and col. 2, lines 5-10 and lines 2-25) as a platinum layer 112 that is described to be formed on a polysilicon plug 110. When referencing Fig. 3B, Nakamura describes that platinum layer 112 is formed directly on a polysilicon plug 110 so that platinum and the polysilicon form a silicide. (Column 2, lines 5-7). Furthermore, Nakamura recites to "resolve above described problems, there is a case that a tantalum layer which does not react with the platinum layer 112 is formed on the poly silicon plug 110, then the platinum layer 112 is formed thereon". Nakamura then describes that the "surface of the tantalum layer 113 maintains roughness of the surface of the poly silicon plug 110, as shown in Fig. 4A". (Column 2, lines 28-31). Item 112 of Fig. 3B is neither taught nor suggested by Nakamura to be a roughened platinum layer. It stands to reason that this roughened platinum layer does not have columnar platinum pedestals terminating in dome-shaped tops.

Platinum layer 112 is also described by Nakamura with reference to Fig. 31 in the context of col. 11, specifically, lines 17-35 of col. 11. In this section Nakamura describes,

A platinum layer 112 is formed on the iridium oxide layer 111. So that, the platinum layer 112 is oriented axially. Then a PZT layer 114 is formed as a ferroelectric material, also a platinum layer 116 is formed thereon as an upper electrode. Thus, a memory device is formed. That is, in this embodiment, a middle layer is formed by the iridium oxide layer 111 and the platinum layer 112.

In according to this embodiment, the platinum layer 112 does not contact with the poly silicon plug 110 directly. Further, the platinum layer 112 is formed on the iridium oxide layer III which has characteristics that the upper surface is flattened even though condition of the under layer is in rough. Therefore, a PZT layer having excellent ferroelectric characteristics can be obtained because of the platinum layer 112 is oriented axially. Also, better characteristics is able to obtained, since a low dielectric oxide is not formed to a boundary between the iridium oxide layer 111 and the poly silicon plug 110.

An iridium layer or an alloy layer made of platinum and iridium can be a substitution of the platinum layer 112, 116.

Applicant can find no teaching or suggestion of a roughened platinum layer with reference to Fig. 31 in the context of col. 11, lines 25-37. It is believed that the iridium oxide layer 111 is taught to be roughened, not the platinum layer. As such, Nakamura cannot anticipate claim 29 for at least the reason it does not teach or suggest all the elements of claim 29. Furthermore, Nakamura neither teaches nor suggests columnar platinum pedestals terminating in dome-shaped tops. Nor does Nakamura teach or suggest the production of these pedestals or dome-shaped tops, nor is there any teaching or suggestion that would render an apparatus having these pedestals or dome-shaped tops obvious. For at least the reason that Nakamura does not teach or suggest a roughened platinum layer comprising columnar platinum pedestals terminating in dome-shaped tops, Nakamura cannot anticipate claim 29.

Claims 30-37 depend from claim 29 and are allowable for at least the reasons stated above regarding claim 29, as well as their own patentable features.

For example, claim 30 recites that the platinum layer is continuous over a prespecified area of the substrate that comprises at least about  $4 \times 10^6$  square angstroms, and that the platinum pedestals can be at least about 300 angstroms tall within the area. The Examiner has rejected these claims as obvious for at least the reason that these features are the product of result effective variables and/or they are a matter of design choice and the Examiner has recited the cases *In re Boesch* and *In re Dailey* to support the rejection.

However, the application of these cases is misplaced. More particularly a finding that the recited features are result effective variables and/or matters of design choice is inapplicable to the recited claims in view of the limited teachings of the reference and amounts to hindsight reconstruction of the claimed subject matter. In order to apply the law of *In re Boesch* there needs to be a result effective variable. It is understandable that Nakamura neither teaches nor describes any such result effective variable for at least the reason it does not describe a roughened platinum layer or any methodology for producing a roughened platinum layer. As such, any result effective variable that can be applied to acquire platinum pedestals, dome shaped tops, and/or platinum pedestals of certain size is not disclosed in the cited reference. Furthermore, as a matter of design choice, there would need to be a result effective variable that the applicant could apply to accomplish this design choice. As stated above, there is no result effective variable described by the cited references. For at least these reasons,

the claims depending from claim 29, as well as claim 29 itself, are not obvious in view of the cited references.

Claim 40 recites a capacitor that includes a first capacitor electrode and a second capacitor electrode with a dielectric layer between the first and second capacitor electrodes. Claim 40 goes on to recite that at least one of the first and second capacitor electrodes comprises a roughened platinum layer with the roughened platinum layer having a thickness of from about 400 angstroms to about 1,000 angstroms and comprising platinum pedestals that are at least about 300 angstroms tall and terminate in dome-shaped tops. For at least the reasons given above, the cited reference do not teach or suggest all the elements of claim 40. For example, Nakamura does not teach or suggest: a roughened platinum layer; platinum pedestals; dome-shaped tops; and/or platinum pedestals having a specific thickness or height. For at least these reasons, Nakamura does not anticipate or render obvious claim 40.

Claims 41-43 depend from claim 40 and are allowable for at least the reasons given above regarding claim 40.

Claim 44 recites a capacitor that includes a first capacitor electrode, a second capacitor electrode and a dielectric layer between the first and second capacitor electrodes. Claim 44 goes on to recite that at least one of the first and second capacitor electrodes comprises a roughened platinum layer with the roughened platinum layer having a continuous surface characterized by columnar platinum pedestals having heights greater than or equal to about one-third of a total thickness of the platinum layer with the platinum pedestals terminating in dome-shaped tops.

As described above, Nakamura does not teach or suggest all the features of claim 44. For example, Nakamura does not teach or suggest: a roughened platinum layer; a roughened platinum layer having a continuous surface characterized by columnar platinum pedestals; pedestals terminate in dome-shaped tops; and/or these pedestals having heights greater than or equal to about one-third of a total thickness of the platinum layer. For at least these reasons claim 44 can neither be anticipated nor rendered obvious in view of Nakamura.

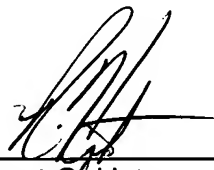
Claims 45-46 and 48 depend from claim 44 and are allowable for at least the reasons stated above regarding claim 44.

Pending claims 29-37, 40-46, and 48 are allowable in view of the cited references for at least the reason that the cited references do not teach or suggest all the elements of the pending claims, nor can the cited reference be used to establish a *prima facie* case of obviousness of the pending claims.

Applicant requests allowance of claims 29-37, 40-46, and 48 in the Examiner's next action. If the Examiner's next action is to be anything other than a Notice of Allowance, the Applicant respectfully requests a telephone interview prior to issuance of any such subsequent action. The undersigned is available for telephone consultation at (509) 624-4276 Monday through Friday, 8:00 a.m.-5:00 p.m. (PST).

Respectfully submitted,

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By:   
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